

Status of pre -burner for SWATH CCD 9Feb03JF
(and other target pulse fitting issues).

Goal – fit target CCD to try to add 2nd pulses
to ‘working’ hit list (fiber, time, energy)
before SWATH CCD reconstruct target.

Should be more accurate representation of
what’s going on in target.

- pi, k separation
- better understanding... and removal of accidentals

Code works for High gain CCDs (only) currently (fitting for
amplitudes of 1st and 2nd pulses and time of 1st pulse
.... currently uses TRS as time of 2nd pulse. Using a
‘reasonable set of cuts, the preburner sends ~6x the
number of second hits to SWATH CCD (compared to pulsate).

SWATH CCD test results on km21 sample

Preburner No -preburner

Itgqualt=0(ok) 70126967

=1(nopi, Kattg tedge) 514556

=2(nopi alongut ctrk) 7579

=3(no K connected to switch) 223223

=4(total failure) 2726

<npi_tg> 10.169.91

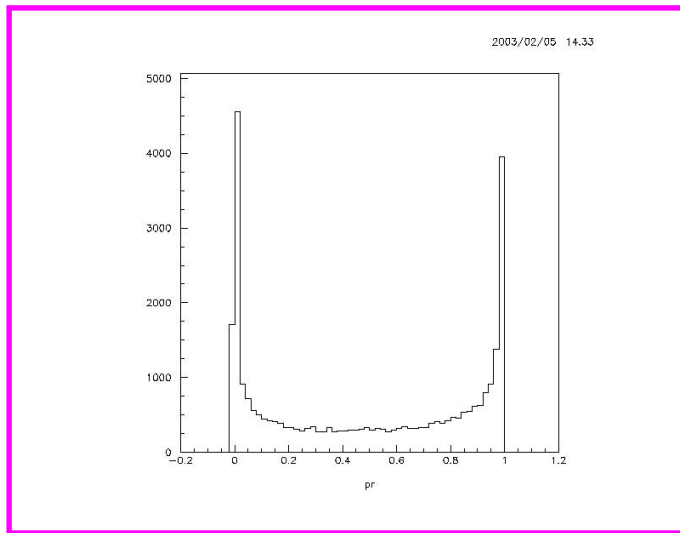
<npiop_tg> 0.91 0.87

=> Efficiency gain is small. Can’t justify preburner
at this time.

Back-up, reverse course.

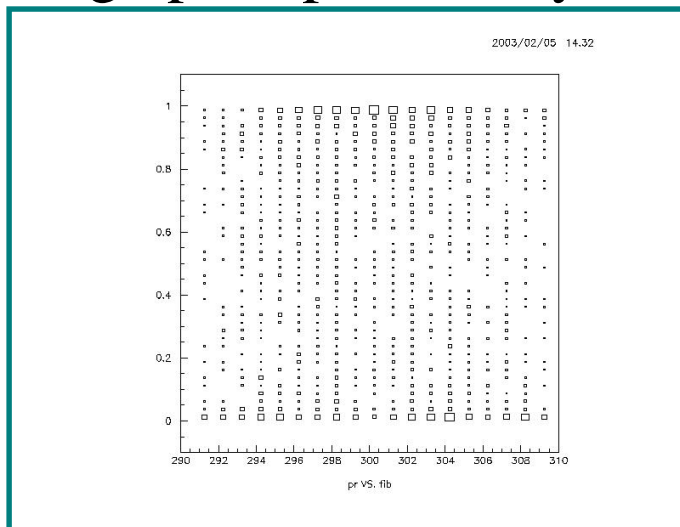
What are the issues in fitting target pulses?

Method: get average 'kaon' pulse shape for each fiber, sigma from distribution (eliminating tails). Use expected shape and sigma to examine each pulse. Scale error bars in each bin $\propto \text{ccd-pulse-area}$. Was critical for pnn(2) analysis.

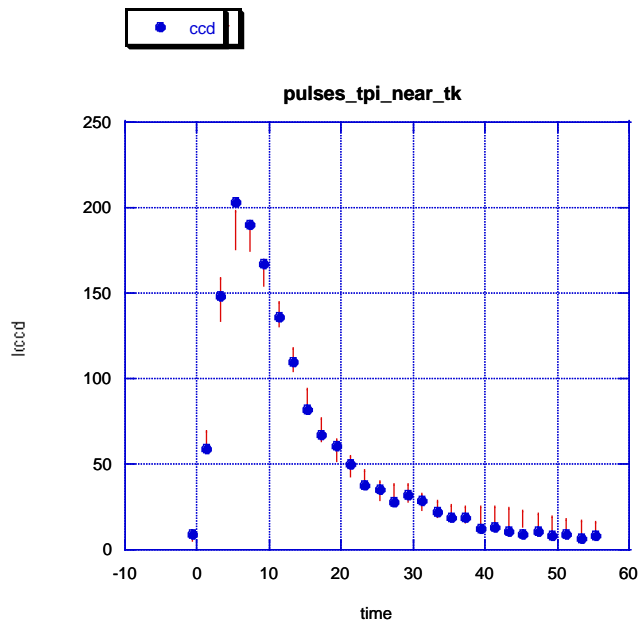


Single probability distributions aren't flat.

Single pulse probability distributions are

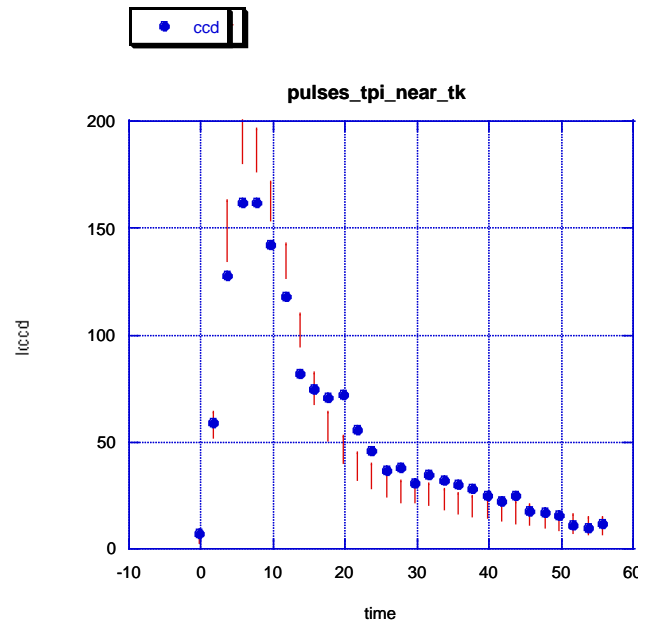


fiber dependent, though pulse shapes are calibrated for each fiber.



Examination of
a lot of pulses
shows that the
error-bars seem
systematically
too big in tail
region.

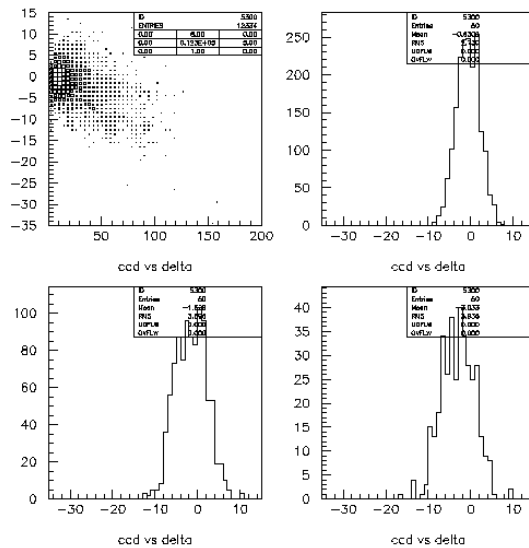
(and/or too small in the
peak region)



How can we determine error bars that are
better? Can we use error bars from data,
rather than from scaled shapefiles?

Lookatdistributionofpixel(i) $-\text{pixel}(i-1)$

2003/02/05 16.11

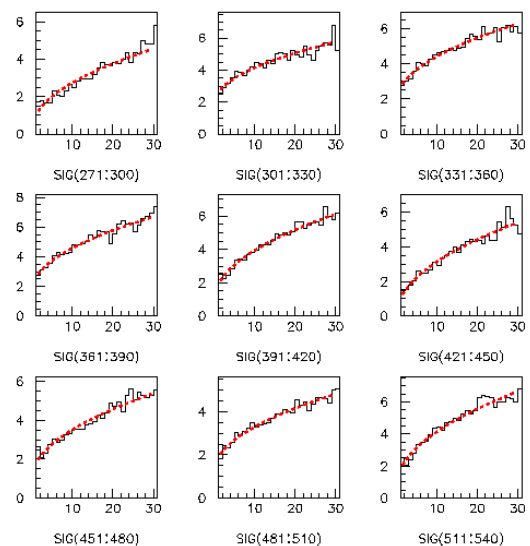


getoffset
andsigma
foreach
ccdbin(at
agiven
timebin)

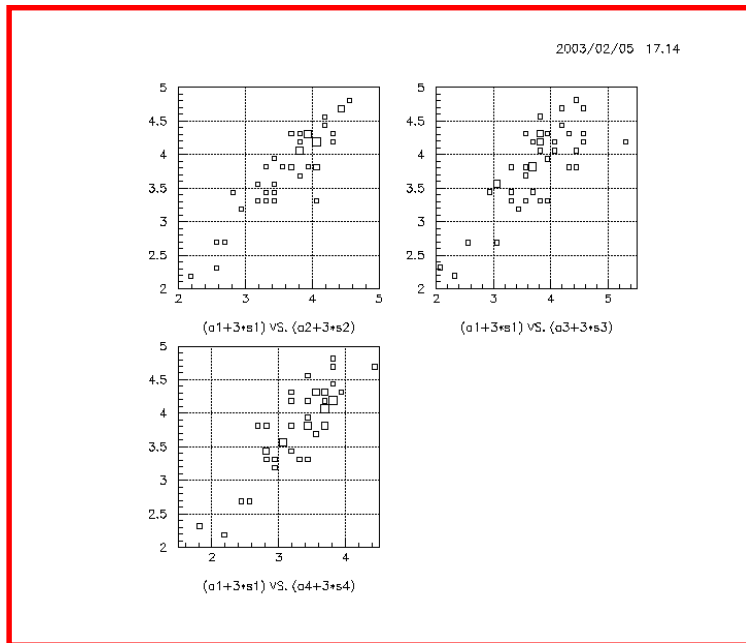
Foreachfiber,plot

sigma
vs
ccdcounts.

Fitto
 $a_0 + a_1 \cdot \sqrt{\text{ccd_counts}}$

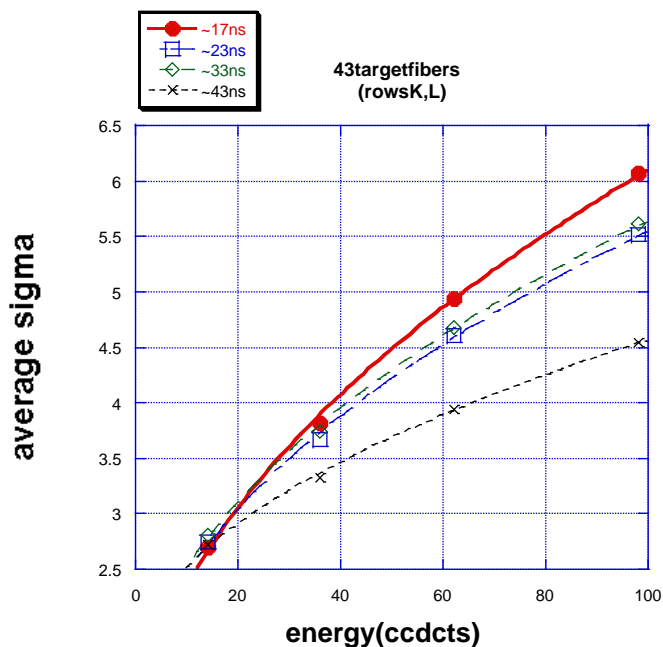


Fitsare~reasonable.Errorsscalewithsqrt
asexpectedifchangescomefrom#p.e.



Using above fits,
determine error for
each fiber at
constant ccd
counts (e.g. for
these plots, 34 ccd
counts, and at 4
different times (17
vs. 23, 33, and
47 ns) for 43 fibers,
TTrows K&L.

Errors at different time bins are correlated
=>
Sigma for each fiber is different.



Plotting average
sigma vs. time,
find σ not only
depends upon
ccd counts, but
also upon
time_in_pulse.

Probably need a term that scales σ with δ .

Also examined $\text{ccd pixel}(i+1) - \text{pixel}(i-1)$.
Find sigma grow by ~25% to ~35%,
compared with $\text{pixel}(i) - \text{pixel}(i-1)$.
Presumably, this provides information about
the timespread of each p.e.

Other open issues:

Must we introduce bin-to-bin correlations into
MINUIT to analyze better?

To complete (or further complicate) the picture,
do we introduce the expected (also observed)
change in pulse shape near the beginning of each
pulse as a function of distance along fiber?
(comes from the mirrored end)

How do we come up with a list of '2nd pulse
times' for fit?

--tr is one obvious candidate

--what else? List of B4 or CK or Cp times?

List of first pulse times in other fibers?

What makes sense?